Pests - mainly insects - attack vines in several ways:

- physically damage leaves: loss of photosynthetic ability of the vine
- live on the leaves not damaging them but sucking their sap: weaken the whole vine
- attack roots: reduce vine's capacity to absorb moisture and nutrients
- act as vectors: feed on vine's sap and carry diseases, viruses, and other ailments from plant to plant
- some insects may physically damage fruit but for wine grapes (as opposed table grapes) the cosmetic damage is not worth spraying against

most growers use minimal insecticides and acaricides (kill mites) as they also kill natural predators who kill pests/insects for free: thus in many regions esp isolated and natural predators in abundance, there's no spraying at all
Sulphur (and other chemicals) sprayed to control Powdery Mildew Oidium) will also control light infestations of many pest species

Beetles
A large number of beeltes attack vines.
ecrivain (Bromius obscurus) and cigarièr (Rhynchites betuleti) both cause severe damage to justify regular insecticide usage
Borers (species of beetles) whose larvae will bore into the woody parts of the vine eg the trunks and the cordons of spur-pruned vines; fairly localized to **California, Oregon, Hunter Valley.**

Cutworms
larvae of moths that live in the soil or under the bark of the vine and emerge at night to feed off the leaves of the vine.
Not a commercial problem for established vines, can attack newly planted vines and slow down new vineyard establishment.

Erinose Mites - Grape Erineum Mite, Grape Leaf Blister Mite
Grapevine being its only known host. Little commercial damage but its leaf form resembles Phylloxera, could be a nasty shock - unsightly affected leaves covered with swellings usu with a reddish tinge. Usu controlled by sulphur.

Fruit Fly - Drosophila, Vinegar Fly, Pomace Fly
Tiny insect, causes little physical damage but will visit damaged fruit by other insects, wasps, or hail, esp in later stages of ripening when sugar levels are high, spreading acetic acid bacteria causing sour rot, raising VA in wines
Mediterranean fruit fly (NOT Drosophila species) is a problem in warm to hot regions eg Australia, South Africa, does similar damages.
Vineyards close to earlier ripening fruit crops apricots, peaches, figs suffer more compared to isolated vineyards or single crop areas.

Grasshoppers, Locusts
Attack vines, eat leaves, reduce vine's ripening ability
Usual control method: spray when numbers reach damaging levels.
Grasshoppers usu migrate from other crops (esp. drought inflicted) to vines (irrigated with green leaves)

Leafhoppers
Damage vines directly by feeding off and destroying the leaves, and acting as vectors for more damaging disease eg Pierce's Diseases, Flavescence Doree, some viruses. Main control methods: spray insecticides, destroy leafhopper habitats, but not entirely successful. A natural predator - a tiny wasp called Anagrus epos, which will lay eggs in the larvae of leafhoppers but these wasps are susceptible to sulphur sprays.

Leaf-rollers, leaf-folders (nothing to do with leafroll viruses)
Insects whose caterpillars damage a vine's leaves, causing them to roll up, lowering the leaf area, reducing photosynthesis. And the wounds invite other diseases eg Botrytis to cause further/greater damage.
Several species, localized to certain regions, mainly controlled with selective insecticides. Natural predators for low levels of attack.

Margarodes - Ground Pearls

Insects that live in the soil and damage vines similar to Phylloxera, causing stunted vine growth, loss of vigor and death eventually.
Also emits nasty smells and impervious to most control measures. There are no rootstocks that resist them.
Largely confined to **South African vineyards** with sporadic appearances elsewhere.

Mealy Bugs
Several species, a few of which will damage vines: little mechanical damage as they cover bunches of grapes with a secretion known as **honeydew**, attractive to a **black sooty mould**, which will taint the wine if taken into the winery; also attractive to several species of **ants**, despite not damaging to vines, will attack natural predators of both mealy bug and other insect pests.
Some species also implicated in the spread of viruses esp Leafroll.
Control of mealy is painstakingly time-consuming, requiring close monitoring before insecticide application programs are made.
Some species notorious to control as their eggs will over winter beneatht the vine bark, impossible to spray.
*Stripping the bark off the trunks and cordons and painting them with a fungicide in greenhouses is an annual task in control of mealy bugs.*

Mites
eg grapeleaf rust mite, Pacific spider mite, red spider mite, yellow mite
small insects spider-looking, colonise and feed off a vine's leaves: reduces photosynthetic ability of the vine and slows down the ripening process.
When severely infested, ***vine leaves turn completely red*** often mistaken for autumn coloring.
Mite activity slowed by **sulphur** used to control Powdery Mildew and an **acaricide** will be sprayed against severe attacks. Predatory mites could also control harmful ones but sulphur sprays can't tell the good from the bad mites.

Moths
A number of moths that cause damage, most common species:
Cochylis - Eupoecilia ambiguella aka Traubenwickler
Eudemis - European Grape Moth - Lobesia botrana
Eulia - Argyrotaenia pulchellana
Grape Berry Moth - Polychrosis viteana
Grape Vine Moth (NZ) - Phalaenoides glycine
Orange Tortrix Moth - Argyrotaenia citrana
Pyrale - Sparganothis pilleriana
it's their larvae that cause the damage by burrowing into the immature grapes when they hatch, while the damage itself could be minor, the wounds in grapes are ideal for fungal diseases eg Botrytis.
**Pheromone traps** confuse the males s.t. they have little time for mating. The only drawback is that all growers in an affected region need to use it otherwise all the males converge on the only unprotected vineyards and mate and then all the egg-laden females disperse throughout the area.
Several species of predators exist and a wide range of pesticides could control all.
Rarely seen in UK but there could be more as it gets warmer.
Attacks from moths tend to be sporadic thus pheromone and feeding traps will often be hung up to monitor their activity amongst vines.

Nematodes, eel-worms

- microscopic worms which live in the soil and can **feed on vine roots**: **deprive** vines of **water and nutrients**, **weaken** vines to fall prey to other ailments
- the root-knot nematode causes **knot-like growths on the vine** and is one of the most widespread
- other nematodes serve as **vectors for viruses eg Fanleaf**
- hard to control chemically, can not be easily eradicated
- most effective method: **nematode-resistant rootstocks**, better hygiene in nurseries
- **dipping rootstocks in hot water at 50C for 30 min** before planting will kill any nematodes present w/o harming plants

Phylloxera - Chapter 2

Scale insects

- a large number of different species of scale insects
- all feed on the sap of the vine, weaken it
- some excrete a sticky substance (honeydew) attractive to the same black sooty mould found on vines damaged by mealy bug with similar results
- controlled by insecticides

Thrips

- are several different species, small black winged insects known as thunder bugs in UK and storm flies in other countries
- feed on young shoots and the pollen of vines during flowering
- cause stunting -> scarring and russeting of the grapes which may cause splitting later in the year as the berries expand
- said to lead to poor fruit set despite scarce evidence
- commercially damaging to table grapes as damage is more visual than material
- are virus vectors on other plants not vines

Western Grapeleaf Skeletonizer

- turns grapevine into skeletons, the larvae do the harm not the moths
- requires spraying, otherwise it could completely defoliate a vineyard
- fairly localized, mainly confined to western US growing regions
- beside spraying, two parasites - one wasp, the other fly - will control it in the right conditions, proven successfully in San Joaquin Valley